WHAT IS CLAIMED IS:

1. A multiple cylinder position sensing system is provided comprising:

a first cylinder including:

a first source light guide having a first end and a distal second end and extending from inside the cylinder to outside the cylinder and adapted to transmit at least a first beam of laser light at a first frequency from outside the cylinder to inside the cylinder; and

at least one first reflected light guide having a first end and a distal second end and extending from inside the cylinder to outside the cylinder and configured to receive light from the first beam of laser light that is reflected off the inside of the first cylinder;

a second cylinder including:

a second source light guide having a first end and a distal second end and extending from inside the cylinder to outside the cylinder and adapted to transmit at least a second beam of laser light at a first frequency from outside the cylinder to inside the cylinder; and

at least one second reflected light guide having a first end and a second end and extending from inside the cylinder to outside the cylinder and configured to receive light from the second beam of laser light that is reflected off the inside of the second cylinder.

2. The system of Claim 1, further comprising a laser light source that is optically coupled to the distal ends of both the first and second source light guides, and configured to generate a source beam of laser light, wherein the source beam is divided into the first and second beams of laser light.

3. The system of Claim 2, further comprising a first photodiode configured to receive and electrically respond to light from the first beam of laser light that is reflected off the inside of the first cylinder from the first reflected light guide.

4. The system of Claim 3, further comprising:

a laser light source driver circuit coupled to the laser light source and configured to energize the laser light source upon receipt of a trigger pulse; and

a timing circuit coupled to the laser light source driver configured to generate the trigger pulse and apply the trigger pulse to the laser light source driver circuit.

5. The system of Claim 4, wherein the laser light source is a laser diode.

6. The system of Claim 5, further comprising first and second photodiode amplifiers that are coupled to the first and second photodiodes, respectively.

7. The system of Claim 6, wherein each of the first and second photodiode amplifiers is configured to generate an output signal.

8. The system of Claim 7, further comprising a pulse expansion circuit, wherein the first and second photodiode output signals are coupled to the pulse expansion circuit.

9. A method for determining the time-of-flight of laser light pulses in a plurality of hydraulic or pneumatic cylinders, the method including the steps of:

generating a first timing pulse in a timing circuit;

conducting the first timing pulse to a laser light source and responsively generating a first laser light pulse from the source;

conducting a first portion of the first laser light pulse through a first optical fiber to a first cylinder;

conducting the first portion of the first laser light pulse into the first cylinder;

reflecting the first portion off a first reflective surface coupled to a first piston in the first cylinder;

receiving the first portion of the first laser light pulse at a first photodiode and responsively generating a first electrical signal indicative of the time of arrival of the first portion of the first laser light pulse at the first photodiode;

conducting a second portion of the first laser light pulse through a second optical fiber to a second cylinder;

conducting the second portion of the first laser light pulse into the second cylinder;

reflecting the second portion of the first laser light pulse off a second reflective surface coupled to a second piston in the second cylinder;

receiving the second portion of the first laser light pulse at a second photodiode and suppressing the transmission of a second electrical signal indicative of the time of arrival of the second portion of the first laser light pulse at the second photodiode; and

providing the first electrical signal and the timing pulse to a comparator circuit and responsively generating a first output signal indicative of a first time difference between the arrival of the timing pulse and the arrival of the first electrical signal at the comparator circuit.

10. The method of Claim 9, further comprising the steps of:

generating a second timing pulse in the timing circuit;

conducting the second timing pulse to the laser light source and responsively generating a second laser light pulse from the source;

conducting a first portion of the second laser light pulse through the first optical fiber to the first cylinder;

conducting the first portion of the second laser light pulse into the first cylinder;

reflecting the first portion of the second laser light pulse off the first reflective surface;

receiving the first portion of the second laser light pulse at the first photodiode and suppressing the generation of a third electrical signal indicative of the time of arrival of the first portion of the second laser light pulse at the first photodiode;

conducting a second portion of the second laser light pulse through the second optical fiber to the second cylinder;

conducting the second portion of the second laser light pulse into the second cylinder;

reflecting the second portion of the second laser light pulse off the second reflective surface;

receiving the second portion of the second laser light pulse at a second photodiode and responsively generating a fourth electrical signal indicative of the time of arrival of the second portion of the second laser light pulse at the second photodiode; and

providing the fourth electrical signal and the second timing pulse to the comparator circuit and responsively generating a second output signal indicative of a second time difference between the arrival of the timing pulse and the second electrical signal at the comparator circuit.

11. The method of Claim 9, wherein the step of conducting the first timing pulse to the laser light source and responsively generating a second laser light pulse from the source includes the steps of:

optically coupling the laser light source to distal ends of the first and second optical fibers; and

dividing the first laser light pulse into the first and second portions.

12. The method of Claim 11, further comprising the steps of:

providing a laser light source driver circuit;

coupling the laser light source to the driver circuit;

applying the first and second timing pulses to the laser light source driver circuit; and

energizing the laser light source responsive to the application of the first and second timing pulses to the driver circuit.

13. The method of Claim 9, further comprising the steps of:

providing a first photodiode amplifier and coupling the first photodiode amplifier to the first photodiode;

providing a second photodiode amplifier and coupling the second photodiode amplifier to the second photodiode;

generating a first gate signal in the timing circuit;

applying the first gate signal to the first photodiode amplifier to permit the transmission of the first electrical signal;

generating a second gate signal in the timing circuit; and

applying the second gate signal to the second photodiode amplifier to suppress the transmission of the second electrical signal.

14. The method of Claim 13, further comprising the step of:

configuring the first and second photodiode amplifiers to generate first and second amplifier output signals, respectively.

15. The method of Claim 14, further comprising the step of:

coupling the first and second photodiode amplifier output signals; and

transmitting the coupled output signals to a pulse expansion circuit.

16. The method of Claim 14, further comprising the step of:

transmitting the first and second output signals to a pulse expansion circuit.

17. The method of Claim 16 further comprising the steps of:

generating an expanded pulse output signal in the pulse expansion circuit; and

outputting the expanded pulse output signal from the pulse expansion circuit.

18. The method of Claim 17, further comprising the steps of:

providing a pulse comparator circuit; and

inputting the expanded pulse output signal and the timing pulse into the pulse comparator circuit; and

generating a time delay output signal in the pulse comparator circuit indicative of a time delay between the timing pulse and the expanded pulse output signal.

19. A method of determining the time-of-flight of laser light in a plurality of hydraulic or pneumatic cylinders comprising the steps of:

transmitting a laser light pulse from a laser diode;

dividing the laser light pulse into at least first and second sub-pulses;

injecting the first and second sub-pulses into first and second cylinders, respectively;

reflecting the first and second sub-pulses off first and second pistons in the first and second cylinders, respectively;

receiving the first and second reflected sub-pulses to first and second photodiodes, respectively;

generating first and second electrical signals in the first and second photodiodes that are indicative of the first and second times of arrival of the first and second sub-pulses at the first and second photodiodes, respectively;

selectively coupling the first and second electrical signals in a first mode of operation to a pulse expansion circuit and a phase comparator circuit to generate a first time-of-flight signal on an output line of the phase comparator circuit that is indicative of the time-of-flight of the first sub-pulse and not of the second sub-pulse; and

repeating the foregoing steps with a second pulse of laser light but in a second mode of operation wherein the phase comparator circuit generates a second time-of-flight signal on the output line that is indicative of the time-of-flight of the second sub-pulse and not of the first sub-pulse of the second pulse of laser light.